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Journal of the Society of Arts.

FRIDAY, MARCH 1, 1867.

Announcements by the Council.

ORDINARY MEETINGS.

Wednesday Evenings at Eight o'Clock:—

MARCH 6.—The following subject for Discussion will be introduced by Mr. CHRISTOPHER COOKE:—"On Storm Signals and Forecasts, their utility and public importance with respect to Navigation and Commerce."

MARCH 13.—"On the Tinnevelly Pearl Fisheries." By CLEMENTS R. MARKHAM, Esq.

MARCH 20.—"On Successful Oyster Culture." By HARRY LOBB, Esq.

CANTOR LECTURES.

Owing to a severe domestic affliction, Mr. Chaffers was prevented from giving his concluding lecture on Monday last. Arrangements will, if possible, be made for its delivery later in the Session.

A Course of Lectures "On Music and Musical Instruments," by JOHN HULLAH, Esq., will be delivered as follows:—

LECTURE I.—MONDAY, MARCH 4.

HARMONY.—Introduction—Greek Music—Mediæval Musical Science—Acoustics—Musical Sound—Vibration—Pitch—Harmonies—Resultant Sounds—Consonance and Dissonance—Tonality.

LECTURE II.—MONDAY, MARCH 11.

MELODY.—Musical System—Tonality, Ancient and Modern—The Subdominant and Leading Note—Melodies in Imperfect Scales and in Ancient Modes.

LECTURE III.—MONDAY, MARCH 18.

MUSICAL EXPRESSION.—Definition—Difficulties of Musical Composition—Realization of Unheard Effects—The Perfect Cadence—The Renaissance—Imitation—Expression, False and True.

LECTURE IV.—MONDAY, MARCH 25.

MUSICAL NOTATION.—Different Systems, Alphabetical and Special—Neumas—Accents—Lines and Spaces—The Time Table—Modern Notation; its Origin and Growth, Simplicity and Fitness.

LECTURE V.—MONDAY, APRIL 1.

MUSICAL INSTRUMENTS.—Classification—Wind Instruments—Stringed Instruments—The Plectrum, Hammer, and Bow—Instruments of the Ancients—Mediæval Instruments; their Introduction into the Church.

LECTURE VI.—MONDAY, APRIL 8.

MUSICAL INSTRUMENTS (*continued*).—Modern Instruments—Chamber and Orchestral—Combination—The Modern Orchestra—Conclusion.

The lectures commence each evening at eight o'clock, and are open to members, each of whom has the privilege of introducing one friend to each lecture. Tickets for this purpose are forwarded with the present number of the *Journal*.

EXAMINATIONS, 1867.

In addition to the prizes announced in the Programme of Examinations, the following are offered:—

The Worshipful Company of Coach and Coach Harness Makers offer a prize of £3 in Freehand Drawing, and a prize of £2 in Practical Mechanics, to the candidates who, being employed in the coachmaking trade, obtain the highest number of marks, with a certificate, in those subjects respectively.

The Worshipful Company of Goldsmiths offer three prizes—of £5, £3, and £2 respectively—to the three candidates who, being employed on works in the precious metals in any part of the United Kingdom, shall obtain from the examiners the first, second, and next highest number of marks, such prizes to be distinguished as the "Goldsmiths' Company's Prizes."

SUBSCRIPTIONS.

The Christmas subscriptions are due, and should be forwarded by cheque or Post-office order, crossed "Coutts and Co.," and made payable to Mr. Samuel Thomas Davenport, Financial Officer.

Proceedings of the Society.

TWELFTH ORDINARY MEETING.

Wednesday, February 27th, 1867; SAMUEL ROBERT GRAVES, Esq., M.P., in the chair.

The following candidates were proposed for election as members of the Society:—

Alsop, John Alfred, 22, Brunswick-square, W.C.
De Salis, Colonel Rudolphe, C.B., 123, Pall-mall, S.W.
Freeland, Humphry William, Chichester.
James, W. H., 78, High-street, Camden-town, N.W.
Kime, William Thomas, Louth, Lincolnshire.
Leslie, Thomas Edward Cliffe, Union Club, S.W., and 22, Old-square, Lincoln's-inn, W.C.
Marsh, William Robert, The Rice Mills, Bromley, E.
Morgan, Fortescue J., Stamford.

The following candidates were balloted for, and duly elected members of the Society:—

Brand, Henderson William, 5A, Courland-grove, S.
Chaffin, Matthew Henry, 18, Hart-street, Bloomsbury, W.C.
Fowler, John R., 1, Mitre-court-buildings, Temple, E.C.
Green, John, 7, Sherborne-street, N.
Harrington, G. H., 5, Billiter-square, E.C.
Hayes, Robert, 1, Pembroke-square, Bayswater, W.
Hoff, Edward, Carpet Manufactory, Louth.
Hopkinson, John, York-place, Oxford-street, Manchester.
Isaac, S., 2, Hyde-park-gate, W.
King, Edmund, 1, Elvaston-place, Queen's-gate, W.
Layton, James, The Wilderness, Baldoek.
Lee, Richard, 39, Lothbury, E.C.
Loughborough, Thomas, 23, Austin-friars, E.C., and Selwood-lodge, Tulse-hill, S.
Macintosh, William, 24, Paternoster-row, E.C.
Phillips, Henry Louis, 32, New Broad-street, E.C.

The Paper read was—

ON THE ECONOMY OF TELEGRAPHY AS PART OF A PUBLIC SYSTEM OF POSTAL COMMUNICATION.

By ELWIN CHADWICK, Esq., C.B.

As an apology for my bringing forward this subject, I beg to be allowed to state that from the practical origin of the electric telegraph I have regarded it with great interest, as a means of public and private economy, as an extraordinary means of saving time in intercommunication, as giving to bodies politic, as it were, a new and quicker set of nerves of sensation and of volition; and, as a branch of administrative study on public intercommunication, I have examined it, as a commissioner of inquiry into the means of establishing a general system of police in Great Britain, and have made particular inquiries into the special utility of its application for the public security. As a commissioner of the first general Board of Health, I have moreover had practical experience of its great value, for executive administration, during periods of wide spread epidemic visitations.

In a paper on railway communication, which I had to prepare when I had the honour to serve as president of the Department of Economy and Trade of the Association for the Promotion of Social Science I adverted to a public system of telegraphic post, as necessary for the safe and efficient working of railways, and as complementary to a proper and complete system of internal communication. Mr. Gladstone expressed to me a wish that I should develop that portion of my thesis separately, and more fully. I did so, and submitted a paper to him, and he transmitted it to the then Postmaster-General, Lord Stanley of Alderley, shortly before the change of the Government.

I have felt it due to the Society to bring the question of postal telegraphy before it as coming, as I conceive, under the same economic and administrative principles as those which my noble friend Earl Fortescue (then Lord Ebrington) and a committee agreed with me in proposing for the support of the Society, as bearing on the collection and the distribution of small parcels by means of the post.*

The leading positions which my colleagues of that committee agreed with me in taking, as respects the small-parcels post were:—

That there belong to the public, in the United Kingdom, in round numbers, ten thousand postal stations, and a service of twenty thousand persons for the collection and distribution of letters; that these public establishments, and the services of those officers (chief and subordinate), are available at a comparatively small additional expense, for the collection and distribution of small parcels for public and for other services; that private individuals or companies can only perform the like extent of service of collection and distribution for any one separate object by an equivalent number of separate establishments, and by the services of an equal number of persons, the separate expense of which for the one special service must be so enormous as to be prohibitory to the greatest amount of ordinary service needed by the public;—that, as a consequence, whilst private persons or trading companies can only extend their present means of collection and distribution at a loss, or at charges which must be practically prohibitory, the public postal establishment may give the requisite service at a low rate, with a profit—if, indeed, profit be the legitimate object of the service—a view which I hold to be a pernicious error detrimental to the freedom of trade.

Now, as to telegraphy. Whilst the public have these *ten thousand* stations and a service of twenty thousand persons, all the general telegraphic companies put together have only some nineteen hundred stations supplying about *thirteen hundred* places, and, I presume, only a proportionate number of persons engaged in the collection and the distribution of messages. In many of

the large towns there are two or three competing telegraph companies, each with its own separate stations. It follows that, under these relative conditions, private or commercial telegraphy must be dear, and must be incomplete, and comparatively slow. And for this reason; that, for each of the eight or nine places now unprovided for, there must be a separate telegraphic station, a separate rent, with lights and coal for a separate office-keeper, and separate messengers to be maintained.

I am informed that, as a rule, it will not pay a private telegraph company to set up a separate station for the accommodation of a new neighbourhood unless it be assured an income of from £60 to £100 per annum or more, according to circumstances; or, as one company states, at least fifteen messages every day, and that, too, at the existing high tariffs of charges, which prove to be practically prohibitory of any further very greatly-extended use of telegraphic communication in this country. Private telegraphs, under the existing conditions, are, and must be, comparatively dear as well as slow, on account of the comparatively long distances necessarily requiring the additional distance and time for portage of messages. The postal stations, being as eight or more to one of the telegraph stations, the distances of the telegraph deliveries must be (except in the larger towns) throughout the country as eight to one or more. This will the least apply to the more closely populated districts, and the most to suburban districts. For example, in Richmond, where I live, there is a telegraph station, but there are adjacent districts, such as Kew, Mortlake, and Ham, where there are postal stations but no telegraph stations. A telegram from London to Ham must be sent three miles from the station at Richmond by a foot messenger, at the rate of sixpence per mile, and it will be an hour reaching its destination; instead of which, if it were from the postal station at Ham, it might be delivered in perhaps an eighth of the time, or in a few minutes. The telegraph tariff from London is a shilling, but the charge for the portage of the message to Ham is eighteenpence. The tariff for a message from London to Manchester is eighteenpence, but to all the suburbs over three miles the charge is a shilling per mile extra for a horse messenger, and where there are postal stations, where there need be no extra charge for portage, the portage, under the existing system, costs more than the message. In the interior of the densely-populated districts, where the difference of the distances for delivery is not so great, there are yet two or three separate companies, whose separate establishments must be paid for by the public.

I repeat, then, that under the existing conditions of telegraphy by separate trading companies, telegraphic communication, to pay, must be dear—must be incomplete—must be slow—as compared with telegraphy in Belgium, in Switzerland, and in Germany, where the public postal establishments are properly utilized for a responsible public service. Even on the main lines, and between the great towns, the trading companies' service is often vexatiously uncertain and comparatively slow, for this reason, amongst others (as recently explained in answer to complaints of messages, which ought to be delivered within one hour, being detained as long as four) that the railway companies, having the privilege of using the telegraph for working their lines, have the priority of the use of the wires, instead of having their own separate wires, which, under a proper system they would have, and thus the delivery of private messages is frequently delayed.

Besides being dear and incomplete from the cost of separate establishments, trading telegraphy is necessarily dear by reason of the local burdens to which it is subject as an enterprise for private profit. It is subjected to parochial taxation, which in one company amounts, as I am informed, to 9s. 9d. per mile per annum on between forty and fifty thousand miles of wire. A

* See *Journal*, Vol VI., p. 527.

body of traders holding forth promises of large profits seek to obtain way-leave for their posts and their wires over private houses and private lands, as well as over public roads. As the company is based on the principle of making charges on the necessities of private individuals for communication, so private individuals or local bodies think themselves justified in making exactions on the necessities of the mere trading company. "Why," says the attorney, to his client, the landowner or other, "should you give them the use of your premises, or the privilege of passing over your land, without payment? They can't compel you." Sometimes the companies are obliged, by refusals or by private exactions—including the exactions of the local bodies having control of parish or other roads—as the price of the privilege sought, to go at much expense by circuitous routes. If telegraphic communication were conducted as a public service it would, of course, be freed from local taxation and from such exactions, which add to the other charges generally prohibitory of the required extensions. I am assured that, on the whole, future extensions needed may be made under public authority at half the expense that must be incurred by the trading companies, and the country, instead of being disfigured by the posts and wires of several establishments on the same line, would be better served by one. In the French cities, under a postal system of telegraphy, wires are carried conveniently along the eaves of houses, without the number of web crossings from separate companies which are becoming very unsightly as well as inconvenient in London; the inconvenience as well as the expense increasing with the number of the companies, whose wires frequently cross and, in times of storm, touch each other, when messages are curiously and comically flashed in wrong directions, producing confusion and nonsense, of which strange examples occurred during the great snow storm.

Under the existing conditions of dearth and great incompleteness in England, the telegraph may be said to be a class telegraph, in regular use only for stock-brokers, produce-brokers, and the higher class of professional men. It cannot be called a domestic or a general public telegraph. For domestic use it is generally only available to very well-to-do classes—the few. For the higher middle classes its use is chiefly confined to extraordinary occasions, to deaths, to mortal sickness, or impending calamity. So much is this so, even amongst wealthy families, that at first a telegraphic message often gives a shock of alarm—that something sad has happened, and is to be communicated. To the many, the lower middle classes and the labouring classes in towns, the present charges may be said to be entirely prohibitory; as also to the agricultural classes. Now it is of national importance that the telegraphic communication should be made to penetrate and animate the agricultural community. Though a farm may be included in a regular postal delivery it is of common occurrence that the cost of a telegram to or from the farmer is half-a-crown, and half-a-crown in the imagination of a farmer is as big as a cart-wheel. To the whole agricultural class facilities for sending district messages would be most valuable. The farmer would be enabled on the exigencies of culture, impending storms, or sudden necessity to get in crops, to telegraph for hands, horses, and assistance; to receive telegraphic messages from his salesman so as to save him from going to market. Salesmen for market garden produce and other transactions of a large amount, for provisioning the larger markets, have not the use of the telegraph, except for wholesale transactions. A cheaper system of postal telegraphy would even be available for the ordinary business of the working classes. An artisan could seek work by it, or, being known to be on the look out for a job, might be telegraphed for, and at the expense perhaps of a sixpenny telegraph, might save half a day or a day, or, having a job in hand in a remote place, on finding himself short of some material, might save a day's time in waiting for it. The saving of

time—the staff of which business as well as life is made—would be considerable if the telegraphic system were to be made more general and cheaper.

For the more ready deliveries in remote rural districts, where the messages may be too few to pay for keeping foot messengers in constant attendance, an arrangement might be made with the schoolmaster of the national or the village school, under a postal system, using the scholars as a corps of ready messengers for the delivery of messages which might arrive in the interval when the letter carrier is on his rounds. A notice would be rung to the school, when the master would name some good boy, who would gladly quit his lesson at the desk and would receive a practical lesson in a service of trust and punctuality, in which he would gladly run over a mountain with the Queen's bag for the reward of a penny.

A valuable suggestion for the dispatch of very cheap messages by the post is made by Professor Wheatstone. He conceives that the messages may be divided into those of ordinary and those of special dispatch by telegraph. There will be a proportion of persons who will not want an answer immediately, or within an hour, but only within two or three hours, or within the day, or so as to save one ordinary postal delivery, to get an answer to some inquiry as to whether a person is at home, where he is gone, when he is expected, how an illness is proceeding, or matters of the like sort, not requiring very special dispatch. The message, with the prepayment of the extra postage stamps, at a less price than for the special delivery, say for 4d. against 6d., or 6d. against 1s., might be put into the pillar, or other post. On being taken to the office, the message would be telegraphed from thence and delivered to its address by the ordinary delivery, so as to save the expense of a special delivery at either end.

Secondary postal telegrams of this sort would have the advantage of freeing the service from the excessive pressure now experienced at particular hours for the dispatch of special messages.

As there are simple and convenient cyphers for private use, the telegraph would, under a good system, be used much more than it is now by private persons and for social purposes, by those who are averse to the transmission of open messages. The companies at present charge double for messages in cypher which would, under improved arrangements, require little extra labour.

Now, as to the general economical or commercial effects of complete and cheap telegraphy. There are indications of its importance in every-day retail commerce, and that the general action of a cheap system of postal telegraphy, more especially in combination with a cheap system of small-parcel post, such as we contended for, and is now in use in Switzerland and Belgium, will improve the whole retail trade of the country, and effect large economies by saving stocks of goods. For example—I find that in the metropolis there are large wholesale houses in the City which have private telegraphs to west-end retail shops, which, instead of keeping large stocks, telegraph for the goods in the City as they are required. Chemists and druggists at the west-end have now private telegraphic communication with the wholesale druggists in the City, whence they get medicines and drugs fresh and fresh as they want them, instead of keeping them deteriorating in store. I am informed by one trading firm in Zurich that, by means of the improved system of telegraphic communication, combined with a parcel post delivery, they are enabled to carry on business with one-third of the stock they used to have before. I am assured by Mr. Cor Vander Maeren, the President of the Tribunal of Commerce at Brussels, that the like effects are manifest in Belgium. I am informed of one warehouse in the city of London, where, by means of the international telegraphic communication, they do as much business now—by economising their supplies by quick

information—with £20,000 of capital, as was formerly done by £100,000 of capital. Now, this system would enable village shopkeepers to do the like. The saving from the mere deterioration of goods kept on hand in large stocks in remote places will be, collectively, considerable; for example, the grocers' stocks—the teas, the fruits, raisins, currants, and such like. On ordinary occasions in domestic life directions may be telegraphed to farm servants and establishments; professional men will forward instructions from their suburban residences to their offices in the City; manufacturers will, from their offices in the City, give directions to the manufacturers in the suburbs. A complete and cheap telegraph would be of special importance for the maritime community, and for the mercantile marine, by enabling passengers and goods to be collected, departures to be expedited, cargoes to be distributed, and parcels to be forwarded. The general economical result would be, practically, to concentrate the whole country.

Our objects, as respects the parcel post, are frustrated by the competing railway companies, who cannot be got to agree among themselves to a uniform goods rate, which it would be so much to the interest of the shareholder as well as of the public to obtain. An opening for the application of our principle as regards the parcel post, has, however, been obtained from the Government, who have conceded the privilege of transmitting samples of goods or other objects by the post.

Having described the conditions of great incompleteness and dearness, as well as comparative slowness, which are inherent to a service by separate competing trading companies, and the obstructions, loss of time, and power occasioned by these conditions to private trade and social life, I now proceed to notice the losses or privations of gain occasioned by these conditions to large branches of the public service, to the police force, to the army and navy, and to the general government of the country.

The adoption of the electric telegraph for the metropolitan, in connection with the rural or county police and general police, would almost double the efficiency of those forces, and would peculiarly serve to promote the habitual use of telegraphy in the rural districts, and its completion as a general national system. The same lines and bearers that led to the police stations, would lead the wires to the adjacent post-office stations, or *vice versa*. Even in the ordinary daily affairs of the rural districts, suppose that gates have been left open and cattle have strayed, or horses been stolen, or a robbery committed. Forthwith the farmer would send to the police station, and a force would everywhere be put on the alert. A known or suspicious character is observed by the police of one district to be on the move; the police of all the other districts would be put on the outlook. At night-fall, again, the poachers might be seen leaving the town by the police, who would telegraph warning to keepers to be on their guard. On occasions of fire, the complete telegraph, carried within reach of every village, would be of great use, though now unknown, with only one-ninth part of the country imperfectly covered. The extra service to the police force would justify contribution to the public telegraph establishments from the public grants now made by Parliament in aid of the county police.

The Minister of War for Belgium declared that placing the railway under public control had doubled the efficiency of the military force, and that the electric telegraph would double it again. This declaration, I believe, would receive the assent of all military men conversant with the subject. I need not enlarge on the peculiar need to this country of all economies of our war force, whether naval or military. At present our War Minister or the Commander-in-Chief writes a telegram on the company's form, sends it to the company's office by a messenger, and pays the fare, I believe, as any one else does, and then it

is forwarded to a barrack or station by another foot messenger. In this slow operation a Fenian clerk might hear to what place the commandant is sending, if not what he is sending about. On looking at a map of the country, within a radius of fifty miles round Cahirciveen, it will be seen that whilst there are about seventy post-offices, there are only seven or eight telegraph stations, a deficiency of about nine-tenths of the available means of quick public information—a deficiency occasioning messages and despatches to be sent slowly by messengers long distances, with the risk of being waylaid and shot down. Of course telegraph wires may be cut, yet that would be an indication of an enemy's presence, and they are easily repaired and guarded. But the deficiency is of means of warning and protection against external as well as against internal enemies. In Prussia, I am informed, indeed it is well known, that in the late war the directing general and tactician was with his own telegraph and cypher in a room in his office in Berlin, where no one knew what was being done, but whence orders were being flashed to separate divisions of the great army, spreading their wide over divergent bases, so as to confound and mislead the enemy, then gathering them together and concentrating them, with a rapidity unknown, so as to bring overwhelming masses to bear upon him at the decisive battle. If anything had gone wrong, reserves might have been telegraphed for, and brought from the plough, or from the forge, or the work-bench, through the postal stations to the most remote villages, and got from thence into rank with a rapidity never before known. The several armies, and even the wings of the same army, were wielded as one force from a department in Berlin more speedily than they could have been by cross messages between one division and another, even if they were only a few miles distant from each other.

Private communication was much interrupted for a short time during the war in Prussia, not, as I am informed, on account of the danger of the conveyance of intelligence to the enemy, but mainly on account of the impressment of the most skilful postal telegraphists for the service of the army during the short and great campaign. The success of that campaign and the results, which surprised our Government as well as others, were largely due to the perception and the use made by Prussia of the public advantages of the principle of unity of administration, as applied to a complete unity of communication, all means of communication for the public including the railways as well as the postal telegraph. Captain Webber, R.E., who has closely examined the continental systems of telegraphy, especially for military purposes, states that he considers that the Prussian system has the advantage over all, for private or popular purposes.

The Government of France is carefully protecting its sea coast by complete lines of telegraph. With us, where the protection is so peculiarly needed in time of war against invasion, nothing like this is being done, whilst vast sums are being spent on internal fortifications. Most certainly, in times of peace, for the Coast Guard service against smugglers, as well as for storm warnings, and for succour in the case of shipwreck, in which some five or six thousand persons are submerged, and between seven and eight hundred persons annually drowned, on our coasts, a complete arrangement of telegraphic communication would be the means of saving vast amounts of money, as well as life, and preventing wrecking and much crime. Our war department ought to have the means of complete and direct communication with every barrack and military or naval station in the country. Powers are reserved to take possession of the private trading companies' telegraphs in time of war; that is to say, in a time of hurry, to take possession of disjointed and imperfect works, extending over only one-eighth of the country, unprotected—with wide gaps of thinly-occupied coast unguarded—which present nothing of profit to

private trading enterprise, but which offer much to the enterprise of invading enemies.

As against one sort of invasion—an invasion, indeed, more dire and ruthless than that of war—the invasion of pestilence, which slew in one year seventy thousand men, women, and children—I had some personal experience of the uses of a telegraphic service. On the visitation of the Asiatic cholera in 1848, we had a very scanty force of competent medical inspectors attached to the General Board of Health. We had despatched two of them to Hamburg, to watch the progress of the epidemic there, and they were at Hull on the point of embarking, when, late in the afternoon, I received a telegram from Edinburgh stating that a case of Asiatic cholera had appeared there. I immediately telegraphed to Hull to detach one of the two inspectors to go on in the next train to Edinburgh, which he did; and to the astonishment of the people there he arrived the same evening within a few hours of their afternoon message. Instances of similar alertness in the direction of a scanty force during the progress of that epidemic were numerous. Immediately an inspector had completed his instructions for meeting the epidemic in one district, without the delay of a post he was, by telegraph, directed to another and distant point of a new outbreak of which we had information. We certainly were enabled by the telegraph almost to double the efficiency of the very small force allowed to us, although the telegraphic service was only available for main lines of communication. If there had been a complete system of telegraphy with every postal station, as now contemplated, and we had been enabled to receive returns of the progress of the epidemic, and transmit directions to medical officers, and information as to assistance hourly as well as daily, the efficiency of the service would have been vastly augmented. Probably it might be so in relation to the cattle plague.

To some persons it might, at first sight, suggest itself, that a consolidation of the central portion of the telegraphic service, apart from the postal service, would be the most eligible course, and that the existing service is beyond the power of management, but those who are conversant with large business arrangements, or with large spheres of administration will be aware, that with system, and under competent direction, the more an establishment has to do, the better every part may be done. It is with this principle in view that I have spoken of the eligibility of the combination of branches of the public service—such as the naval and the military—with the private service of telegraphic communication. I consider, however, that the practicability of the combination is settled by the examples I have cited of continental states, if it were not determined, as I believe it is, by the high administrative authority of Sir Rowland Hill. With respect to the existing telegraph companies, I am unaware of anything disparaging to their general management. Such default as there may be in their position is the fault of the legislature, and this is due to dereliction of the primary public duties of any properly-constituted government, and the evasion of responsibilities to maintain complete and cheap means of communication, as a public service. The companies have laboured through difficulties and expensive trial works, and *bonâ fide* conflicts, to accomplish the ends they had legislative sanction in undertaking, and much of this expense would probably have not been incurred had the service been early undertaken by our Government, as it has been by the Governments of Belgium, Switzerland, and the chief German states. The companies would be entitled to compensation on the principles recognised in such cases, which need not, as assumed, be by a direct lump payment, or any payment at all from the Exchequer, but by a special telegraph stock, a money raised on the public security, giving the shareholders some security for their existing dividends, and a payment by giving interest on the capital expended. Instead, however, of adverting here to the losses by the non-application, as I conceive them, of economical

or administrative principles, we have rather to show the gain to be derived from reverting to them.

Assuming that the telegraphic communications were not to increase, and that the stations were not to be extended beyond those of the existing companies, it may be safely stated that the savings of establishment charges by the consolidation of three separate establishments, and by utilising the public establishments, would be found, on close and competent inquiries into the details, to suffice amply for the purchase of the companies, and the compensation of the permanent officers on the usual conditions, and would, moreover, leave a surplus for insuring against loss by early and large reductions of rates upon a uniform system.

The important question which has to be determined for the public is the rates at which the required service may be given to them under unity of management, and also the question of uniform rates. The main ground established by Sir Rowland Hill for the penny postal system was, that whether a letter was delivered in London, or was sent from London to Edinburgh, there was a difference of one thirty-sixth in the cost; that it was not, therefore, worth while to put either the sender of the letter or the post-office to the trouble of taxing the letters. It might at first sight appear that there would be a greater difference in the case of telegraphic messages, arising from the length of the wires. But long land lines of wire are to some extent paid for by each large town or district through which the line passes, so as to properly distribute the charge locally. If, moreover, the uniform franc rate be good for all Switzerland, or the half-franc rate be good for all Belgium and other continental states, we may assume that the principle of uniform tariffs is good for this country, as in the case of letters.

The several great special public uses to which a complete system of telegraphy is subservient, as separate sources of large economies ought, by the distribution of establishment charges over the widest extent of service, to contribute to the reduction of the tariffs, as well as the completeness and punctuality of the deliveries to private individuals. The uniform franc or tenpenny message, all over Switzerland, yields a surplus and increasing revenue; and I am informed that a further reduction of the tariff is contemplated. With a wise state economy they have reduced their uniform letter postage to nearly a halfpenny. In Belgium a reduction has been made from the uniform franc to a uniform half-franc; and M. Vinchens, the able engineer-in-chief of the service, informs me that the number of telegrams have, within a year, been more than doubled, and the gross receipts for the interior service increased more than 18 per cent. There have been some augmentations of establishment charges, apparently having relation to international messages, which have prevented the net returns being as yet fully replaced, though they are expected to be in a short period. Were it otherwise, conceive the immense economical advantage of doubling the speed of business transactions and other affairs by the reductions made. I do not, however, accept the instance of Belgium, a large proportion of whose population is very poor, whose letter communication is little more than half that in England, as a guide for this country, with its greater commerce, manufactures, and wealth. But in London itself, a telegraphic company, for sixpenny district messages, failed "commercially," and was compelled to raise its tariff to a shilling, being borne down, I presume, by the weight of the separate establishment charges, and the consequent incompleteness of its stations, until it was taken up by another company for the delivery of its messages. On the other hand we have in Paris an example of a postal district telegraph which has succeeded in a remarkable manner, with a uniform half-franc, or call it a sixpenny, message. In six months from the time of the reduction from one franc to a half-franc, the number of the messages was

augmented tenfold; but even in Paris, I do not admit that, either in business or in social life, the value of time equals that in London, or in our chief manufacturing cities.

The judgment of the postal authorities in England would, I apprehend, be that it would be safer to begin with a uniform minimum of a shilling rate—*i.e.*, safer for them not to be run off their legs in the first instance. This last is a consideration, to which it is fair to give due weight; otherwise, when a habit is to be altered or framed, the greatest speed will, as a rule, be eventually made, by giving the greatest stimulus to change, in the first instance, charging the lowest rate contemplated, and warranted by experience such as that which I have cited from Belgium.

One special advantage derivable from the proposed extended utilisation of our postal establishment for telegraphic communication would be, that it would serve as a source of contribution to a better payment fairly due to the valuable and underpaid officers engaged in it; and as a means of getting more intelligent and trustworthy persons into the lower departments of the service, and in remote districts.

It is inconceivable that in the face of Continental experience and example the present state of telegraphic communication in this country should be permitted by the public to be continued, and, certainly, all delay of reform must be at the expense of the public for increased compensations. I may add that in the senate of the United States, a committee on the post-office and on the post roads has urged that the post-office department shall be authorised to undertake postal telegraphy, as a work of necessity and public convenience.

Let me recapitulate the chief conclusions which I have to submit. They are—that cheap and complete telegraphic communication, with the speedy and punctual delivery of telegrams, next to the cheap, speedy, and punctual delivery of letters, is of the highest importance to the manufacturing, commercial, and agricultural service of the country, as well as to the service of the state, for the army, the navy, and the police. That the present telegraphic communication of the country is made unnecessarily dear, by the charges of several incomplete establishments, to perform a service that might be better performed by one. That there are in the United Kingdom ten thousand post-offices, and a service of twenty thousand persons engaged in the collection and delivery of letters, available for the collection and delivery of telegrams, as proved by the example of Belgium and Switzerland, and other well-governed continental states. That the private telegraph companies have only some nineteen hundred telegraph stations—a little more than one to five of the postal means of ready collection and speedy and cheap delivery. That, by reason of the charges for separate establishments, rents, and payments for separate services, with local taxes and extra charges, to which trading telegraph companies are subjected, they cannot adequately multiply their existing stations and means of speedy delivery except at double rates of cost and at extra rates of charge, which are practically prohibitory to the habitual use of telegraphic communication by the great mass of the community. That, by the use of the existing postal establishments pervading all parts of the country, the postal service may—as is done by the postal establishments of foreign states—convey telegraphic messages at low rates of charge at a profit, which private companies can only convey at the same low rates, at a loss. That, by reason of the existing conditions of the burthens of multiplied and separate capitals, and of the restricted number of stations, and distant and dear portrages, with consequent high rates of charge, and in many cases slow deliveries, the habitual use of telegraphic means of communication is chiefly confined to the few; to certain classes for large transactions, such as those of the money markets, to large manufacturers, bankers, and professional persons, and to domestic uses on extraordinary occasions. That

telegraphic communication in this country has not been brought within the means of habitual use by the great body of retail traders, nor of the agricultural or middle classes, nor of labourers throughout the country. That it has not yet been brought into complete and proper use for the public by the police, by the navy or the army for the purpose of internal defence or for the action of the chief administrative departments of the State, as it is by responsible constitutional Governments on the Continent. That out of the economy of the charges of the separate establishments of separate private companies produced by consolidation, together with the increased traffic obtainable by telegraphic communication through the post at reduced tariffs, fair compensation may be made to the trading interests in public telegraphy which have been allowed to be formed, and that the proper responsible duties of the Government for the maintenance of the safe and free use of all public means of communication, as a service, may be advantageously resumed without direct expense to the revenue, and with large indirect advantage to it by the augmentation of the commerce and production of the country.

On this subject of inter-communication, which is really one great means of promoting free trade, as well as social intercourse, it is becoming to this country, as constituting an emporium for a large part of the commerce of the world, to have regard to international as well as domestic convenience. By Sir Rowland Hill's great improvement in administrative art and science, England has taken a lead amongst civilised nations in inter-communication by letter. About three years ago there was an international congress held in Paris of executive officers engaged in the postal departments of the chief continental states, to consider and promote improvement in international communication by letter. At that congress, England had its place. Last year, a like congress was held of the executive officers of the continental states to impart to each the benefit of the domestic experience of all scientific, mechanical instruments, alphabets, as well as in administration, and to promote improvement in intercommunication by the telegraph. At that congress, and on that subject, in which England had the lead in the wonderful application of electricity—one great glory of our time—the English Government, to its European scandal for its torpidity, had no place, and England no representative. Is that to continue to be so?

Its proper place may, however, be gained for it by action on disinterested Parliamentary opinion; for there does not stand opposed to the application of correct economic principles in this branch of inter-communication by telegraphic conveyance, the like amount of strong personal interest, nor the like large masses of capital in different categories, with claims to compensation, nor *primâ facie* difficulties of management requiring fatiguing attention and investigation, as there does for the reform of railway conveyance. The conditions of the conveyance by telegraph being less complicated and more manageable, with an authority prepared and competent to deal with them, as, I believe, the chief permanent officers of the post-office to be, there is better promise of earlier success in obtaining the reform now in question. I have no doubt of the eventual general application of the reformed principles governing inter-communication, which I have so long advocated as important to the progress of commerce, manufactures, and the arts, which this Society is united to promote; I believe the cost of every species of conveyance may eventually be thus reduced one-half. Great as have been the benefits derived from the repeal of protection duties on corn and other articles, I believe it will be found that they are inconsiderable as compared with the benefits derivable from the removal of excessive charges on transit, as well as fiscal and other obstructions to free inter-communication.

DISCUSSION.

Mr. JOHN DAVIS observed that Mr. Chadwick, in enumerating the various uses of the telegraph, had not adverted to a singular abuse of it, which had been invented during the recent war in America. It was what they called "tapping" the telegraph; or, in other words, intercepting the messages and possessing themselves of their contents. That was a more ingenious plan than the cutting of the wires; and, as the subject of telegraphs was under discussion, he thought this fact deserved to be mentioned.

Mr. W. B. GALLOWAY remarked that the importance of complete arrangements for telegraphic communication throughout the country could not be over-estimated. He thought Mr. Chadwick's proposal that the existing postal arrangements should be extended to the delivering of messages sent by telegraph was perfectly practicable, and would be highly beneficial to the public. The system on which Sir Rowland Hill founded the penny postage in this country might, he thought, to a great extent be made applicable to telegraphic communication, especially by adopting a uniform rate of charge, and arrangements might be made for the delivering of messages and letters every half-hour, by the present or an increased staff of letter-carriers. The accomplishment of the grand project of establishing telegraphic communication between this country and the United States might, to a certain extent, be regarded as a fulfilment of the prophecy that "Knowledge shall run to and fro in the earth." He had no doubt that in a short time such arrangements would be made in connection with the postal system of the country as would enable the community at large to avail themselves to the fullest extent of the advantages afforded by telegraphic communication.

Mr. WEBBER remarked that he did not agree with the author of the paper in desiring that the existing telegraphic system should be taken out of the hands of the trading companies and placed in those of the Government. He was not himself a believer in Government interference in such matters. They were told in the paper that there were a great number of places to which telegraphic communication did not extend; but at the same time they were also told that in such places farmers regarded the half-crown which they were now charged for a telegram as a thing "as big as a cart-wheel." As a taxpayer, he (Mr. Webber) protested against supplying those gentlemen with such a public convenience as was now proposed until their range of vision brought the half-crown down to something like its normal circumference. They were told that the District Telegraph Company in London had failed, commercially, on account of the little use made of it by the public. In his own experience, in relation to the loss of some property on its way to his premises, he might state that the very public department which of all others ought most to avail itself of telegraphic facilities—viz., the police—neglected to do so in his own case, and left the investigation of the matter to be carried on through the ordinary channels of official communication. He was not quite sure, looking at this instance, whether, if Mr. Chadwick's proposal were adopted, the same red-tapism might not be extended to the whole telegraphic system throughout the kingdom.

Mr. J. H. MACKENZIE was inclined to support the views of Mr. Chadwick. He had no doubt there were many matters which could be best carried out by private enterprise, but he thought the telegraph system was an exception to the general rule. London being the great centre of the trade of the country, it was most desirable that there, more especially, every possible facility in the way of telegraphic communication should be afforded. There had been a company formed known as the Universal Private Telegraph Company, which, however, had not been able to develop itself to the extent that was expected, owing in a great measure to the monopoly

which the other telegraph companies possessed. One great objection to all public systems of telegraphy was that the messages sent were made public, whereas the perfection of telegraphic communication was privacy. The great advantage of the Private Telegraph Company was that business firms having houses in the City and at the West-end were enabled, by a well-known simple instrument which could be worked by a lad after a few weeks' practice, to transmit messages without anyone else knowing anything about them. A few years ago he endeavoured to bring about some arrangement for working the above-named company in connection with the other principal companies, with the view of extending the system of private communication; but after a great many interviews he failed in doing so. He conceived that one benefit to the commercial world and to the public, from the Government taking the matter under its superintendence, would be that they would not look so much to profits on the transmission of messages as to the extension of free trade and free inter-communication throughout the country; and, supposing there was a loss at first, a portion of the surplus revenue of the post-office might be applied to meet it. He thought the benefits of easy and rapid communication ought to be given to the public to the fullest extent possible, and that the surplus profits of the postal department ought not to go to benefit the taxpayers, but to the improvement of the system of communication. They would not desire a lower rate of postage than that which at present existed, but he thought that department might fairly be asked to undertake the risk of any pecuniary loss arising from the proposed extension of the telegraph system under its management. He suggested that the present minimum charge of a shilling per message might be reduced to as low as threepence, and any loss that thus occurred would be more than met, in his opinion, by the surplus profits of the penny postage system. By extending the advantages of the telegraph to all towns having a population of 5,000, a very large additional portion of the public would be benefited. The postmen might be the means of delivering the messages, and the delivery, both of letters and messages, in large towns might be made hourly instead of at longer intervals; the uniform charge of 3d. would pay the expenses of the extra carriers that would be required. Letter carriers in the country would only be too happy to fill up the time which they now employed in business, other than that of the post-office, by delivering these messages. The present existing companies might be left to carry on their present business, even in competition with the government, for while admitting that, as a rule, it was undesirable that government should undertake to enter into competition with private enterprise, he thought this was a national question which might be regarded as exceptional.

Mr. BLASHFIELD agreed as to the importance of extending to the smaller towns telegraphic communication, which could be carried out at less expense under the auspices of the Government than by any other means, inasmuch as the wires could then be laid along less circuitous routes than when the matter was in the hands of trading companies. The placing the telegraph in connection with the post-offices throughout the kingdom would be an immense advantage. At present, even in towns returning two members to Parliament, the telegraph arrangements were often very incomplete. In many places in the midland counties, for instance, the post-offices were opened at half-past six in the morning, and the letters were delivered before seven; but they could not send off a telegram in reply till nine or ten o'clock. In many cases the persons in charge of the telegraph were scarcely able to read writing, and the most absurd mistakes were sometimes made. In some parts of the country it was necessary to go miles to a telegraph station, because, perhaps, some land-owner had refused to allow the wires to be carried over his property. Another advantage of the proposed connection of the telegraph with the post-

office was that the wires would be more under control for the use of the public than they were at present, and a greater amount of protection to them would be afforded than was now the case.

Mr. CAMPIN remarked that the last speaker was in error in supposing that the telegraph wires could be carried by a more direct route, if the system were under Government control, than they were at present. A trespass upon the rights of private property could no more be committed by the Government than by a private company, except under the authority of an act of Parliament, which would be necessary in each case. The same gentleman also suggested that if any pecuniary loss arose from the system being carried out under the management of the post-office, the surplus revenue of that department should be applied to meet that loss; but if there was a complete system of telegraphic communication available to the public for all the concerns of life, it might be expected that there would be a corresponding decrease in the number of letters, and a proportionate falling-off in the revenue derived from that source, so that the surplus might not be so large as it was at present. That was an element in the question which ought to be considered.

Mr. W. HAWES said this subject was very much akin to other questions which his friend Mr. Chadwick had brought before this Society on previous occasions; the point under discussion being, in fact, whether the great works of this country could be carried on more cheaply, more usefully, and with greater public advantage, if placed in the hands of the Government than by being allowed to remain in those of the great companies which now conducted them. For his own part, he thought Government interference in any such matters was most undesirable. All present would agree that if telegraphic messages could be sent for a penny or twopence each it would be a very great boon to society. But, conceding all the advantages which Mr. Chadwick had pointed out as likely to result from greater facilities in telegraphic communication, he differed from him entirely in his view that these could only be obtained by Government interference. Why did not the Government first commence the system of telegraphy, instead of leaving it to the public to do so? If they were so anxious to benefit the public, and to go in advance of public intelligence and enterprise, why did they not originate the system, instead of waiting till the public had incurred all the risk and expense in bringing to perfection one of the most beautiful applications of science that had ever been made in this or any other country? After so many years had been spent in bringing the system of telegraphy into its present state of practical utility, solely by private enterprise, the Government were ready to take it out of the hands of those who had really done the work, asserting that they could carry it on better and more cheaply. Undoubtedly, if Government were to take advantage of all the discoveries that had been made up to the present moment, and without showing any consideration for shareholders—for those who had advanced their capital to bring the system to its present perfection—if they were to start with it now, when all difficulties had been overcome, undoubtedly they could work it more cheaply than was done by the present companies. But would anyone say that Government ought to take possession of all these works without giving ample compensation to those in whose hands they now were? And if this compensation had to be given, where was the advantage? Mr. Chadwick said Government would supply the telegraph to so many more towns, and would perform the service more effectually; but of this there was no proof. If Government were to have the control of the railways and the telegraphs, there was no end to the application of the principle when once it was admitted that Government could do these things better than the public. They had been told by one gentleman that the Government could carry the wires over private

property in a way that a company could not do, and by that means the nearest route could be secured. Even if this were so, there would be little or no advantage, for it made scarcely any difference whether one telegraphic line was a few miles longer than another. The difference of time in transmitting the message was not perceptible; it was only a question of cost of construction, and it was found to be cheaper to carry the telegraph along the side of a railway, than to take an independent direction across the country. A company was started some time ago to carry messages at a uniform rate of sixpence for certain distances, and a shilling beyond. That company started with confidence of success, but it did not obtain it; not that it had not plenty of business; but each year the loss was greater, because every message transmitted cost more than was paid for it. They could only pass a certain number of words per day through the wires; it was simply a question of having the wires fully occupied or not. The concern he had referred to was merged into the old company; and he did not think the public were materially injured. Mr. Chadwick had spoken of the competing telegraph companies, but, practically, there was but one company, though some of the railways had telegraphs of their own; for instance, the South Eastern had a line of wires, of which the public had the benefit, by which many towns were supplied. All the advantage which would be gained by the Government taking the telegraphs into their hands would be the concentration of management, which had been dwelt on in the paper; but that the work would really be done more economically, or more beneficially, under Government monopoly than under the present system he (Mr. Hawes) denied; and he believed the public would be better served in this, as in other matters, by doing the work themselves, than by intrusting it to the hands of Government.

Mr. HANCOCK thought the case made out in favour of the telegraph system being taken into the hands of the Government was so strong as to justify a departure from the ordinarily sound and unimpeachable laws of political economy. The analogy between letters and telegrams was exact, except in one particular. A letter was sent by railway to its destination; a message was forwarded by means of a wire. The writing a telegram was analogous to writing a letter; the only difference was that it had to be committed to another person who sent it by the wire, and had then to be re-written by another official at the receiving office, and to be delivered at its destination. He thought it had been shown that the telegraphic system could be worked in connection with the existing means of collection and delivery of letters which constituted the principal cost of the postal system, for they had been told that the difference in the expense of delivering a letter in London and sending it to Edinburgh was only $\frac{1}{16}$ th of a penny. The larger proportion of expense, therefore, was in the collection and delivery of the letters, not in the transmission. He thought this was a strong ground for asking the Government to take the telegraph into their hands, and combine it with the postal system. They had seen that on the Continent the telegraph system was more convenient, cheaper, and more certain than in this country, and this had been brought about within the last few years, for formerly the telegraph service on the Continent was irregular and the charges excessively high. With regard to the failure of the London District Telegraph Company, the truth was that this was chiefly attributable to its having attempted to do more than its capital could carry out, and in the contemplated extension of its system it was brought to a standstill for want of capital. He thought if that company had had capital enough to carry out its plans in the manner contemplated, it would have been a success instead of a failure.

Mr. SEYMOUR TEULON said there was no doubt that if every small town and village in England could be provided with telegraphic communication at a cheap rate,

it would be a great benefit to those places; but there was one great difference between the carriage of letters and the sending of telegraphic messages which should not be overlooked, viz., that letters were collected and distributed by the post-office, but they were carried by private companies. It was true the authorities had the power to send their own trains with the letters, but they found it more economical to send the mails by the public trains, and, on the whole, he believed they were satisfied with the way in which the service was performed. In the case of the telegraph, only one wire could be used for a certain amount of messages. If more messages were required to be sent an increase in the number of wires would be necessary; but in the case of letters, the number of bags composing the mail might be multiplied to almost any extent, and the whole could be delivered at the same time, and carried at the same cost, to the post-office, while, in the case of the telegraph, the expense was increased in proportion to the number of messages sent. There was also this further difference; in the case of letters, there was of course complete privacy, while all messages, even of the most private character, must necessarily pass through the hands of the telegraph clerks at the offices of transmission and delivery; and in the event of the system being transferred to the post-office, we should be placed in the startling position that our most secret communications would all pass through the hands of Government officers, and he thought the public would hardly like to send private messages through that channel. Another difficulty was that it was an essential element in telegraphic communication that there should be immediate delivery of the message. Unless that were ensured, the very essence of the system would be lost. But one of the main points in Mr. Chadwick's proposition was that the ordinary letter-carriers should have the charge of delivering the telegraphic messages; another suggestion was that the boys at a village school should be employed for that purpose; and a third suggestion was that the rural letter-carrier would in that way find full employment for his time. For the reason just stated, viz., that promptness of delivery was an essential point in the system, he thought those suggestions must be at once discarded. If the post-office undertook this work, they must have the means at hand for an immediate delivery of the message, otherwise they would fail in the very object sought for.

Mr. SCUDAMORE (responding to the invitation of the Chairman) said, in complying with the request of the Chairman to say a few words on this subject, he did so under a disadvantage, because although he might state that the officials of the post-office had, some time since, proposed a plan, which was now under the consideration of the Government, relating to this question, he was not at liberty to describe it in detail. If the Government had come to a decision upon the subject he would have been most happy to have submitted the full details to such a meeting as this, because he was confident that any objection which might have been raised would have been advanced in a thoroughly public spirit, and, probably, the post-office would have derived benefit from the consideration of those objections. Thus much, however, he might say, that though he had no claim to all the good words Mr. Chadwick had said in reference to the management of the post-office, he thought they could do more to facilitate communication throughout the country than the existing telegraph companies were able to do. He thought he could, at the proper time, prove that the post-office could, at much less cost than could the present companies, bring telegraph stations nearer to the public, and at the same time save the public considerable expense—that the post-office could, at less cost than the present companies, keep the telegraph open five or six hours a day longer than it now was, and thereby afford the public greater opportunities of sending messages than they now enjoyed; and, by reason of the post-office being able to

work with one staff, with one set of wires, with one set of instruments, and with one central establishment instead of several, they would be able to effect an important reduction in the charges for messages throughout the whole of the United Kingdom. He did not claim for the post-office any superiority of management. He did not deny that the existing telegraph companies could obtain the services of the same class of men as that from which the *employés* of the post-office were now, and might be in future, drawn; but he did say that, by being able to work with one establishment, with one set of electricians, and with one set of wires, and by reason of their having in every little village of the country an office at which some one must remain stationed, throughout the day—he had no hesitation in saying they could do the work more effectually and more cheaply than any telegraph company could do, unless they incurred greater cost than they did at present. He would give a proof of this. They had heard of the failure of a company which set out with the intention of charging a low and uniform rate for messages throughout the United Kingdom. They had been told it failed because it could not do the work at that price. The truth was the company failed, not because it could not do the work at the price, but because there were two other companies, with more means and larger staffs, who, at the moment the rival company commenced at a low rate of charge, reduced their rates also; and because the public did not show its gratitude to the company who commenced the low rates, by giving their sole support to that company, it failed. But what was the rate they proposed? It was a uniform rate of one shilling for 20 words to any part of the kingdom. There had been a uniform rate of 10d. in Switzerland for many years, and that had produced a profit to the state. In Belgium also, a rate not exceeding one franc had produced a large profit to the state, so much so, that the government gave that profit back to the public by reducing the charge to half-a-franc. It might be said that the cost of the construction of the telegraphs was less abroad than it was in this country, and that, therefore, it was necessary to charge more here; but this was not the case. In Switzerland the cost of the telegraph per mile was, within a small sum, the same as it had been in the United Kingdom; but the rate per message from the commencement, in Switzerland, had been 10d. for 20 words, which had produced a profit. In Belgium, the cost of construction per mile, owing to the smaller extent of country and there being no submarine lines, had been less than in this country; the result was that with a 10d. rate they produced the large profit of 40 per cent. upon the whole capital, and they were now able to give that back in the shape of a reduction of the rate. That which had thus been done in Belgium and Switzerland it seemed to him might be done in the United Kingdom; and he said this without laying any claim to superior intelligence or good management on the part of the office with which he was connected. It had been suggested by one speaker that the surplus which was derived from the revenue of the post-office should be appropriated to meet any loss which might occur upon the telegraph enterprise. He did not imagine that the state would incur any loss whatever by taking the management of the telegraphs; but even if he thought it would, he would be the first to say that relief should be given to the taxpayers of the country from the present surplus. He had heard with surprise this evening the proposition that the surplus of the post-office revenue should be applied to the relief of the national taxpayer, as if it were not so already. He confessed he thought the national taxpayer did now get the benefit. His own opinion was that the surplus revenue from the post-office, which was growing every year, was a proper part of the national income; indeed he looked forward to the time when that surplus revenue would take the place of the whole of the present income-tax; and he thought all would much prefer to pay

the amount of the income-tax in postage than as now by direct taxation. If, as he supposed, the post-office, by undertaking the management of the telegraph, could not only give greater facilities to the public at a lower cost than that at which they could now obtain them, but at the same time could lay by something in aid of the national budget, would any one say that was not a great advantage? It was suggested that the privacy of the telegraph would not be so complete under the post-office management as it was now. He thought that was a misconception. If they were now considering for the first time the establishment of the telegraph and the transmission of open messages, it might be for them to consider whether they could find a sufficient number of trustworthy men and women to transmit these private messages; but if, while the companies employed precisely the same class as the post-office employed, there had not been a single breach of confidence, it was surely too late to hazard the proposition that the privacy secured under the existing companies would be lost when the work was transferred to the post-office. One of the speakers had said it would be desirable that the post-office should take the management of the telegraph, because it would lead to the extension of the system to all towns having a population of 5,000. He might say that if the scheme now before the government were carried out, he should be disappointed if towns with a population of 5,000 were to be the only places to derive the contemplated benefits. It was intended to go, without loss to the state, to much smaller populations than that, and he did not despair of seeing the time when, supposing the administration of the telegraph was handed over to the post-office, the lines would be as closely extended throughout the United Kingdom as they were at this moment throughout the whole of London.

Mr. CHADWICK said, after the very complete and satisfactory answer which had been given by so high an authority in the postal service as Mr. Scudamore, there was little for him to add in reply to the remarks that had fallen from his friend Mr. Hawes. With respect to that gentleman's inquiry why the Government did not commence the telegraph system, and why it had been left to the trading community to do so, he would remark that the postal system itself, in its early origin in this country, was a system of all sorts of trading companies, who, in the language of olden time, "pestered, confused, and obstructed the service," to an extent that rendered it absolutely necessary that public responsibility should be brought to bear on its management. With respect to the possibility of doing anything, he thought the fact of a thing having been done was strong evidence of its possibility; and the fact of what he now advocated having been done in constitutional states like Belgium and Switzerland—to say nothing of despotic states—was sufficient evidence that the same course would be feasible in this country. He would go further and say that a government which could not do what was done in such states as he had mentioned—which could not perform duties like those which had so benefited the public elsewhere—was a government that certainly ought to be reformed. With respect to the "tapping" of the messages, resorted to by the Americans, that was an act which he hoped no one in the country would be guilty of, either under a private or public system of telegraphy. The Austrians, during the late war, tried to "tap" the messages of the Prussians, but they could make nothing of them, and they gave up the experiment, because the Prussian messages were sent in a system of cypher. This would be equally available for any private messages in this country. He was satisfied with the way in which the propositions he had put forward had been confirmed by the high authority they had heard that evening; and he ventured to hope that he should have the support of this Society in promoting an early adoption of the system.

The CHAIRMAN, in closing the discussion, said he

would, in the first place, express his satisfaction that this Society should have thought this subject one which it was competent to take up. The ventilation of the question could not fail to do great good, and he thought, supported as Mr. Chadwick appeared to be by the majority of those who had spoken, it might be said that a step had been taken in effecting this important object. He confessed that all his own feelings were in favour of the suggestions which Mr. Chadwick had made; but he was not surprised that in this or in any other assembly there should be some little jealousy of government interference. There was doubtless much mis-management in many government departments, but it did happen that there was one department which stood out conspicuous for good management, and that was the post-office; so that he thought they would have no hesitation in committing the telegraph system of the country into the hands of that office, if it should be the decision of Parliament that it was right to do so. He should be sorry to find fault with the management of the existing companies. He believed they did all they could consistently with the interests of the shareholders, but the fact that they were only just beginning to pay a fair dividend must be a proof that they were not in a position to meet the wants of the public. So far as their lines were at present extended they did pretty well, but it became every day more important to extend the system, for we were coming to the time when we could not carry on even the retail trades of the country without the help of the telegraph. Those persons living in places not reached by the telegraph were almost excluded from the advantages of the commerce of the country. It was on their behalf, more especially, he was anxious to see originated some system which would give them the advantage of this rapid means of communication. He did not believe it was possible for the existing system to do that. The post-office was in a very different position. They had the machinery already provided which was needed for extending into the heart of every community the blessings of the electric telegraph system; and he hoped they would be enabled to do so. With these few remarks he begged to call upon the meeting to permit him, in their name, to tender their most cordial thanks to Mr. Chadwick for his interesting and very able paper.

The vote of thanks was then passed, and acknowledged.

Proceedings of Institutions.

MARLBOROUGH READING AND MUTUAL IMPROVEMENT SOCIETY.—An entertainment in connexion with this Society was recently given at the Town-hall, Marlborough, by Mr. George Buckland, of the Polytechnic. The entertainment was entitled "Jest and Earnest."

PARIS UNIVERSAL EXHIBITION.

The preparations are going on with increased rapidity. On the French side the whole of the wood work is finished in many classes, and very little of the floor remains free. The portions devoted to other commissions have not so finished an air, as there is nowhere the same amount of enclosure and general arrangement as there is in the French part. Other countries evidently intend to follow the old plan of covered counters to a considerable extent, while glass cases, systematically grouped, are the general rule of the French commission.

The whole of the gallery to be appropriated to the history of art workmanship, the retrospective museum, is completed, and each entrance closed by solid doors; and the glass cases to contain the marvels of art of past times are being fixed in their places.

The fine art galleries are all ready for the pictures,

statues, and other works, so that this portion of the exhibition only awaits the arrival of the works themselves, which can be hung in their places in a few days. The French jury of admission has exercised a very rigorous judgment, the number of pictures admitted being less than six hundred.

As in the industrial portion of the exhibition, so in the picture gallery and retrospective museum, the English commission has adopted different colouring from that of the rest of the exhibition, namely, a flat olive tint in place of a dull red; and the opinion of artists seems in favour of the change. The objectionable false ceiling, too, has disappeared, and has been replaced by a semi-transparent fabric, which stretches over the entire opening between the coverings of the roof. On dull days the galleries look rather sombre, but the English division will possess the incontestable advantage over all the others placed in the curved portions of the building, namely, that the light will fall nearly equally on all parts, and, moreover, that drawings placed on screens along the centre of the floor, if the amount of space demand such an arrangement, would be nearly as well lighted as the pictures on the walls.

The specimen of English domestic architecture in the park attracts great attention, the bold-pitched roof and gables, the exhibition of the timber work on the surface, the covering of tiles of variegated form and colour, from black to light-red, and, more than all, the stacks of ornamental chimneys, constructed with moulded and cut bricks of various tints, which, like the tiles, are of English manufacture, induce numerous inquiries as to the country of which the style is native. It still goes by the name of the Queen of England's Pavilion, although it does not appear that it is destined to any such application, but is to contain specimens of various apparatus and arrangements for the warming and ventilation of buildings. Another surprise of the same kind is reserved for our friends abroad in the form of a bay of the new South Kensington Museum, the materials for which are now being prepared under the superintendence of the son of the architect, the late Captain Fowke; this specimen structure will be of large dimensions, about sixty feet in height, and of nearly the same width, and will certainly convey a good notion of our working in brick and terra-cotta, and, it is to be hoped, of our architectural taste also.

In the English department of the machinery gallery a steam crane, sent by Messrs. Shanks, of Arbroath, is mounted upon the service rails, and doing capital work. Two other steam machines are now to be seen standing in inglorious idleness in one of the main roads of the park; these are traction engines, of 6 and 12 h.p., built by Messrs. Aveling and Porter, of Rochester. They stand idly at present under the Union Jack, which now flies bravely in the park, but it is more than probable that their aid will be gladly called in before long.

Amongst foreign departments within the building, Sweden and Norway, Morocco and Tunis, have lately shown great activity; the first-named, like its neighbour Russia, is fitting up its court with characteristic wood-work, and, although heavy, it has an architectural air, and will attract attention.

The courts of Morocco and Tunis are already blazing in gold and colours, as characteristic, and to us as novel, as the decorations of their neighbours—Turkey, Egypt, and the Danubian Principalities; the whole together forming a remarkable contrast with the chaste, solid wood-work of the Russian court close at hand.

The garden enclosed by the building will very shortly be in perfect order, four large oblong basins, in which fountains will play, are in various stages of forwardness, and the flower-beds and gravel walks are being prepared. On the walls of this inner garden, as well as on the outer edge of the building towards the park, the names of the various exhibiting countries will appear in conspicuous characters over the doors of the avenues leading to their several departments. This will be found very

useful, for strangers are greatly perplexed by the curvilinear form of the building.

The number of persons now engaged in preparations for the exhibition is very considerable, and as many as seven thousand people have paid for admission as visitors in a single day; some of the places of refreshment have, therefore, been already opened. Most of the cafes and restaurants on the French side are nearly ready, and the English and some others will not be long behind-hand; one of the former has already had its prices inscribed over its door, and it may be satisfactory to mention that they are not very much higher than those which are charged by the same establishment in the Palais Royal. There seems every promise of abundant means of refreshment at prices more moderate than usual under similar circumstances.

In the park the structure now erecting for the Imperial Commissaire-Général begins to present an imposing appearance; it is composed of solid oak framing, put together in divisions before being mounted on a rusticated basement of artificial stone—*Béton aggloméré*. It will form a pleasing pendant to the English house mentioned above, especially as both belong to the same period, or nearly so. Just behind the offices of the commission and juries, a building of considerable size is being prepared for the service of the post-office and telegraph; these are very conveniently situated, but there will also be what may be called district offices attached to the international club at the opposite side of the park.

Amongst the new buildings is one of considerable size, in which the models and plans of the works of the Isthmus of Suez Company are to be exhibited.

The Sultan's mosque and the three buildings of the Viceroy of Egypt now make a most imposing appearance. The mosque is peculiarly graceful, with its well-proportioned cupola and taper minaret, around which workmen have just fixed the gallery from which the muezzin reminds the faithful of the hour for devotion. The porticos, doors, and windows are ornamented with arabesque work, somewhat resembling that of the Alhambra, but it does not appear that it will be coloured. Two of the Viceroy's buildings are decorated in similar style, while the third, the great temple, in the style of the epoch of the Pharaohs, is being covered within and without with the well-known emblems of the period, and with copies of ancient mural paintings in brilliant hues. For a temporary purpose this temple is a marvellous structure. The fellah's house is nearly finished.

The pavilion of the Bey of Tunis, not far removed from the Turkish and Egyptian group, is a very large building, three stories in height, with a façade capped by two small cupolas, the entrance to which is by means of a bold double flight of steps, in the form of a horse-shoe. This, like two of the Viceroy's buildings, is to contain a series of illustrations of the habits, manners and arts of the country which it represents.

The horticultural garden, perhaps, exhibits progress more than any other part of the Exhibition grounds; the iron framework of the glass-houses is nearly all in place, the two aquariums are approaching completion, the lakes and canal are finished, the flower-beds and gravel-paths are nearly all formed, and masses of shrubs are being planted.

It is well to mention that the boilers which are to supply the British section with steam will soon be ready; Messrs. Galloway's three 40 h.p. conical tubular boilers are set, and places are being prepared for one of Messrs. Hayward and Tyler's vertical tubular boilers, and for a "safety tubular boiler," by Messrs. Howard, of Bedford, each of 30 h.p.; a sixth boiler will complete the series.

Everything seems in a fair state of preparation, the only legitimate cause of uneasiness being the bringing to the Champ de Mars of the enormous mass of machinery and goods which are to furnish the Exhibition; in this case the old adage of "first come first served" is one

which every one should not only bear in mind, but act upon with the utmost possible dispatch, if he desires to be in good time.

SPECIAL EDUCATION IN FRANCE.

M. Duruy, the Minister of Public Instruction, continues his efforts to raise the intellectual position of the people of France with unabated zeal and success. Not long since the Minister passed a day at the new establishment for special education at Cluny, and examined all the details of the school and college attached, as well as the works of the pupils, in order to judge of the effect of the new system, and to see what improvements might be introduced into it. The result of the investigation is reported as highly satisfactory. The sympathy existing between the pupils and their instructors is said to be remarkable, and punishment almost unknown. In the case of the normal pupils, there have been no cases of complaint whatever; and during the month of January not a single boy in the junior school was punished, while in December only one was confined to school for half-an-hour.

The establishment already numbers one hundred pupil teachers, and ninety boys in the college; and it already possesses the nucleus of a magnificent practical museum. M. Duruy invited manufacturers and others to contribute towards the collection, and his invitation was admirably responded to by the great iron-masters, coal-owners, engineers, metal-workers, spinners and weavers of all kinds of materials and fabrics, glass, chemical, china, pottery, paper, leather, glue, brick, chocolate, piano, furniture, and other manufacturers. To the donations of these gentlemen have been added fine collections from the Imperial factories, the department of the woods and forests, and other public establishments, the faculties of sciences of Paris and the departments, the Museum of Natural History, and the government of Algeria.

A considerable number of books on science and the Arts have been presented to the library of the college. The department of the Saône-et-Loire, in which Cluny is situated, subscribes £3,200 a-year towards the maintenance of the establishment.

The salaries of the director and professors have been fixed by the Minister, as follows:—Director, from 6,000 to 8,000 francs; professors, of first class, 4,000 francs, second class, 3,500 francs, and third class, 3,000 francs. The salaries of the curators range from 1,200 to 1,800 francs per annum.

The school and college were opened on 1st of November, and the total number of pupils, including those not resident, amounted at the opening to 218.

The Minister was met upon the occasion of his visit by the authorities of the town and department, the rector of Lyons, and several educational inspectors, and by a gentleman from Canada, whose name is not given, but who is described as superintendent of public instruction in Canada; and after the inspection the Minister, the visitors, professors, and the whole of the pupils, both of the normal school and junior college, sat down to a collation, towards which fifty pheasants were sent from the Imperial preserves.

M. Girardin, Dean of the Faculty of Lille, has accepted a professorship of agriculture and rural economy in the Lycée of that town.

The Imperial Society of Agriculture has conferred a medal on M. Wagner, controller of the normal school of Strasbourg, for the aid which he has given to the teaching of agriculture and horticulture in the public schools of France.

A society has recently been formed in the Department of the Eure and Loire, which has for its object the development of popular instruction of all kinds, by assisting poor communes with funds, remunerating teachers, or forming public libraries.

Generally it may be said that all the world in France

is impressed with the enormous importance of public instruction, and that the efforts to give to every youth not only general but professional education are constant and enlightened.

Fine Arts.

CIVIL SERVICE.—SUPPLEMENTARY ESTIMATES.—An additional sum of £905 is required in respect of the designs now on exhibition at Westminster, for the enlargement or rebuilding of the National Gallery. Each architect receives for his plans, &c., £200, and a sum of £105 has also been awarded to the surveyor for assisting the committee of judges. Furthermore, Messrs. Banks and Barry have received £1,575 in respect of the designs on the site of Burlington House, which had to be abandoned when Parliament determined that the National Gallery should remain in Trafalgar-square. Six hundred pounds has been voted to Mr. Cope, as additional remuneration for the frescoes painted by him in the Peers' corridor. It will be remembered that a commission was appointed to revise the payments which had been made to the painters employed in the decoration of the Houses of Parliament; and in consideration of the greater time and labour involved than had been anticipated, and of the higher prices which artists now gain than formerly for their works, it was recommended that Mr. Cope, among others interested, should receive further remuneration. For eight frescoes Mr. Cope was, under the original contract, to be rewarded at the rate of £600 each, or £4,800 for all. It is now agreed that he shall be paid an additional £100 on each work, which will make a total of £5,600 or £700 a-piece. Some of the artists concerned are not yet quite content. These supplementary estimates also include an item of £817 for the completion of the monument to Sir John Franklin; likewise the further sum of £50,000 required to meet payments to be made in the year ending March 31, 1867, for expenses in the British Department of the Universal Exhibition at Paris.

WELLINGTON MONUMENT, ST. PAUL'S.—The public will be happy to learn that this model, about which, owing to delays, much discussion has taken place, is now so far completed, that the execution of the monument itself may properly be commenced. It is proposed now to advance to the sculptor, Mr. Stevens, one-fifth of his commission, viz., £2,800, in addition to the one-third already paid.

EXHIBITION OF HISTORICAL PORTRAITS IN PARIS.—The Pompeian house built for Prince Napoleon in the Avenue Montaigne, has passed into the hands of M. Arsène Houssaye, the well-known author and editor of the *Artiste*, who is now engaged in preparing an exhibition of portraits. It is said that the project has been well received, and that the collection is likely to be a highly interesting one, including many fine and curious works, especially of the revolutionary period. M. Arsène Houssaye's position in the administrative department of the Beaux Arts, and his reputation as an art critic, give him peculiar advantages for such an undertaking.

ELECTION OF ART-JURIES IN FRANCE.—The minister of the Beaux Arts has just issued the regulations respecting the jury for the admission of works of art and the awarding of prizes for the annual exhibition of the works of living artists in Paris this year. The principle of the election of a portion of the members of the juries by the decorated and medalled artists is maintained, but the proportions are somewhat changed. Last year three-fourths of the jurors were elected by the artists, and only one-fourth by the administration; according to the new regulations two-thirds are to be elected by the artists, and one-third by the department. The number of jurors is also considerably reduced. In the section of painting and drawing there are to be but fifteen mem-

bers in place of twenty-four; in sculpture, nine instead of twelve; in architecture, six in place of eight; and in that of engraving and lithography, six instead of eight. Three supplementary members are to be named in each section to fill up vacancies, two to be taken from the the artists' lists, and one to be appointed by the administration. It was feared that the Universal Exhibition would take away from the interest of the Salon this year, but the contrary is now the impression; the space allotted to the fine arts is so restricted in the building in the Champ de Mars—there is not room for more than seven hundred pictures—and the preparations for the year of the exhibition are so large, that the Salon, it is now believed, will be unusually brilliant. In connection with this subject, it may also be mentioned that the artistic season, which usually finishes with the first ray of the summer season, is expected to be prolonged this year to a much later period, and the list of coming sales of works of art is unusually long and important. This might have been predicted from the attractions held out to the amateurs and connoisseurs of all nations to visit Paris this year.

Commerce.

ASPHALTE.—The discovery and use of asphalté may be traced back to the most remote periods, and numerous vestiges of its employment may be found in the ruins in Egypt and Babylon. It seems then to have fallen into disuse, as no traces of it are found in the gigantic works of the Romans; and it does not appear to have been in use until the beginning of the 18th century, when a vein of asphalté was discovered by a Greek professor, named Eyrini, in the course of a geological excursion in the Val-Travers, Neuchâtel; experiments were made by him on its nature, and it was found to be a calcareous substance impregnated with bitumen, and yielding, by heat, a mastic of the same quality as the Babylonian cement. Enchanted by his discovery, Doctor Eyrini, in 1721, published a pamphlet, in which he very much exaggerates the value of asphalté, even stating that it was used in the construction of the Assyrian and Egyptian monuments, totally forgetting that this substance, melting at so low a temperature, could only be used in those latitudes for the foundations, or for those parts sheltered from the sun's rays. In his pamphlet notice is also taken of its being adapted for various purposes for which it is now used, but no mention is made of the use to which it is now applied, and to which it owes its great success, namely, foot pavements. Europe was entirely supplied with asphalté from the Val-Travers until the discovery of it at Seyssel, the working of which has been a most fluctuating speculation. In less than a year £20 shares went up to above £640, and afterwards fell to £1. This had a bad effect for the time on the use of asphalté, which in 1838 began to be employed for the construction of foot pavements in Paris; but now this industry has regained its standing. The municipality of Paris uses it exclusively for the construction of footpaths, and it is rapidly replacing, on a large scale, macadam in the construction of streets.

Colonies.

AUSTRALIAN LEECHES.—A Melbourne journal says that this branch of trade has grown to pretty extensive proportions, both as to the number collected and the distances to which they are forwarded. The trade is principally carried on in connexion with the operations of the Murray River Fishing Company, the fishermen employed by the company turning their attention at seasons unfavourable to the fishery to the collection of leeches. From 150,000 to 250,000 leeches are sometimes

collected in one of the trips of the company's steamer. They are then packed and conveyed to Melbourne, where a large proportion of them are put up for transmission abroad. Large numbers of them are sent to London and Paris, where, it is stated, they are preferred to leeches brought from any other place; but the principal outlet for the export is America, where the demand is always great, from the absence or rarity of the proper kind of leech throughout the whole of that great continent. The shipments of the company are made to San Francisco, Panama, and New York, whence they become distributed in all directions. The export from this colony appears likely to be a remunerative business for some years. The company referred to anticipates that from two to three millions of leeches will pass through their hands this season.

THE INTERCOLONIAL EXHIBITION.—It is calculated that the number of exhibitors at the Intercolonial Exhibition at Melbourne will be as follows:—

Queensland exhibitors	41
New Zealand	56
New Caledonian	42
South Australian. (This includes very many exhibits by few exhibitors.) ..	80
West Australia	196
New South Wales	272
Tasmania	637
Victoria (fine arts, 200; others, 1837) ..	2,037
Total	3,361

DISTRESS IN NEW SOUTH WALES.—The latest accounts speak of a marked improvement in the condition of the working population of this colony, a large portion of which was lately in very distressed circumstances. The discovery of rich gold-fields at the Widdin Mountains has given a means of livelihood to some thousands of persons that were sorely in need of aid, and the demand for labour has been considerably enhanced. In some parts of the country the squatters have found it difficult to obtain shearers, and the farmers have been seriously inconvenienced for want of reapers. The committee appointed to inquire into the distress in Sydney, state that much distress is owing to large numbers of skilled and unskilled labourers being unable to obtain employment, and, for the relief of this state of things, they actually propose to check importations, with a view to "encourage native industry." They recommended "that an Act should be passed to impose a duty of 20 per cent., *ad valorem*, on all timber except in log, on furniture, carriages, shoes, saddlery, harness, and all apparel and slops imported after July 1, 1867."

Obituary.

THOMAS MARTIN, F.R.C.S., died at Reigate, on the 12th of February, in the 88th year of his age. He was born at Pulborough, in Sussex, November 3rd, 1779, and was the eldest son of Peter Martin. His father, who was descended from good English and Scotch families on the male and female side respectively, emigrated from Edinburgh when the events of the '45 were still fresh in memory, and settled himself at Pulborough as a general practitioner. At 15 years of age, Thomas Martin became a volunteer in the Petworth corps of yeomanry, and after serving for two years, he proceeded, on October 1st, 1796, as a student to the then united hospitals of Guy's and St. Thomas's. Cline was at that time lecturing on anatomy, with Astley Cooper as his assistant and demonstrator; Fordyce was teaching to large classes the practice of medicine, materia medica, and chemistry; Haighton was inculcating the principles of midwifery and physiology; while amongst the surgeons were "old Lucas" and Cooper, the uncle of Sir Astley. After completing his studies, he went down to Tunbridge Wells to take charge of the practice of Mr.

Prince, of that place, during his illness. Mr. Martin was early initiated in the difficulties and responsibilities of private practice; with the self-reliance thence arising, he finally settled in practice at Reigate, on February 19th, 1800, marrying a few years later the daughter of Mr. Thomas Charrington. In 1812, having always had a fondness for societies and a strong feeling in favour of the principle of association, especially for men engaged in the same profession, he was one of the most zealous and active of those associated apothecaries and surgeon-apothecaries who commenced proceedings, under the leadership of Dr. Mann Burrows, with a view to improved medical legislation. In the same year he founded the Surrey Medical Benevolent Society, which has grown continuously in prosperity. Mr. Martin took an active part in the establishment of the Provincial Medical and Surgical Association at Worcester. He suggested the formation of the south-eastern branch of the association, which, under the fostering care of himself at first, and, later, of his son, Mr. P. Martin, attained its present flourishing and influential position. He established a journal for the better enunciation of the views of the association. In 1830, Mr. Martin suggested the establishment of a mechanics' institute, after the manner of Dr. Birkbeck, to give rational evening employment and recreation to the people in his neighbourhood. The society so formed has grown into increased importance, and has lately given off an offshoot, the "Working Men's Institute." Mr. Martin was one of the first to assist in establishing a Cottage Gardener's Society. He also established some years ago a Surrey Church of England Schoolmasters' and Schoolmistresses' Association. A savings' bank for adults and a penny savings' bank for children had also a share of Mr. Martin's attention. Mr. Martin took an active and liberal part in building new churches and establishing national schools in the parish of Reigate. His energy of body as well as mind was great. It was no uncommon feat with him in his earlier years (when railroads were not, and the byeways of the Reigate neighbourhood were horse-knee-deep in mud), after getting through a hard day's work in the saddle, to ride to London (twenty miles), hear an oratorio, ride home the next morning to a breakfast of the simplest kind, repeat his daily round, and return to the plainest dinner, of which any kind of stimulant by exception only formed a part. Nor was it merely in animal power that he showed himself so supreme; like his father before him, he was "the old student" to the end of his days. At an age when most men, when they read at all, read merely for amusement, he was not satisfied with anything short of instruction. With the decision of a man who "knew the good and did it," he united the mildness and the courtesy of a Christian gentleman. With the tact and delicacy of a courtier, he still preserved a perfect singleness of heart; and known here—but how imperfectly known save by a very few—for his self-denying liberality, his character was adorned by that greatest gift of all, which is "charity." He was elected a member of the Society of Arts in 1852, and took a deep interest in the Society's proceedings, especially in that portion of them which related to the Union of Institutions and the examinations connected with them.

SIR GEORGE SMART, the well-known musical professor, died on Saturday, February 23rd, after a short illness. He was born in London, in May, 1776, and for more than half a century was at the head of the musical profession in the metropolis, acting as conductor of the leading concerts in town and country. He was director of the Lenten Oratorios from 1813 down to the period when the Sacred Harmonic Society was started, when the performances of sacred music in Drury-lane and Covent-garden Theatres were given up. He was conductor of the festival in Westminster Abbey, in 1834. He directed the music at the coronations of William IV. and Queen Victoria, and was organist and composer to the Chapel Royal, St. James's, for many years. Sir George

was one of the original founders and members of the Philharmonic Society, in 1813. In 1836 he, at the Liverpool Festival, introduced, for the first time in this country, Mendelssohn's oratorio "St. Paul." The Duke of Richmond, Lord-Lieutenant of Ireland, knighted Sir George in 1811, at Dublin. He was the musical director at Covent-garden Theatre in the Kemble days, when he went to Germany to engage Weber to produce "Oberon." The last-named composer died in the house of Sir George, then residing at 91, Great Portland-street, on the 4th of June, 1826. The career of Sir George was one of the longest ever enjoyed by an artist. As a professor of the pianoforte, but much more as a singing master, he had an immense *clientèle*, and he gave lessons until he was long past 80 years of age, and the majority of singers, native and foreign, destined for sacred singing, took lessons of him, amongst whom the names of Jenny Lind and Sontag may be recorded. He was a life member of the Society of Arts, having been elected in 1816, and was a member of the Musical Pitch Committee, appointed by the Council in 1859.

Notes.

STEAM FERRY ACROSS LAKE CONSTANCE.—A plan has been proposed for carrying railway trains across Lake Constance by a steam ferry. According to the plans submitted, 14 to 16 carriages are to be sent on a steam ferry, constructed for the purpose, and furnished with rails; the steam ferry to be 200-horse power. An ingenious mechanical arrangement is adopted for meeting the variation of the level of the water, and thus facilitating the embarkation of the carriages. The estimate of the cost is said to be moderate. The negotiations to carry out this project are already begun with the managers of the Wurtemberg and Bavarian railway.

Correspondence.

THE WATER QUESTION.—SIR,—In reading your notice of a pamphlet on this subject by Mr. Bailey Denton, I could not but feel surprise that an engineer of such eminence should entirely overlook his own undeniable statements,—“that rivers form the natural drainage of the country through which they flow, and that all waste and sewage must inevitably find their way to them in some shape or other.” The great object to be attained, and to which no allusion is made by Mr. Denton, in the quotations which appeared in the *Journal*, is, therefore, to clear our rivers of all impediments in their course to the sea; that is to say, to remove and clear away all dams, weirs, and other obstructions, of whatever kind, which have been placed or constructed from time to time for the use of inland navigation, mills, waterworks, or other purposes. Two advantages, of great national importance, would be derived from such a clearance. First, we should hear very little of the pollution of rivers, which would then have a clear course to the sea in deep beds; and, secondly, the recurrence of disastrous floods and inundations would, in a great measure, be prevented, and there would be a considerable diminution of the banks and shoals which infest the mouths of all our rivers, both large and small, at their exit into the sea. In order to render evident the impropriety of artificial obstructions to the free course of a river to the sea, I will suppose that wherever was found a few inches fall in the great drainage system, now being carried out for the benefit of the metropolis, a dam or weir should be interposed, when the consequence would be that the result of the drainage would be *nil*. It is the same with our rivers, and we are daily witnessing the direful consequences of such a practice. It will be objected that the cost of a wholesale clearance of our rivers would be

enormous, but hardly greater than the estimate of Mr. Denton, which would ultimately be found to be about one-tenth of the real cost, and with little prospect of effectual relief; more especially as the great sacrifice of property from disastrous floods must be placed against the cost of clearance, which would, in a great measure, prevent their recurrence. Inland navigation may now be considered nearly defunct, as it does not produce sufficient revenue to keep the locks and weirs in repair, and these are now in a universal state of rottenness. Indeed, there have been intimations that the canal proprietors, or commissioners, are intending to apply for a parliamentary grant for that purpose, so there can be no great amount of compensation required for the destruction of such worthless property. In regard to mill property the case is somewhat different, but owing to the destruction of our rivers by dams and weirs most water millers have adopted the steam-engine as an auxiliary, which, in many cases, has actually superseded the water-mill. Steam is much more economically applied than formerly, and will be much more so in the future, so that, considering the advantage of situation, the total abandonment of water power, so useful in the early dawn of civilization, will cause no very great sacrifice of commercial interests. Moreover, the statistics of loss of property by floods and inundations would show an amount more than sufficient to cover the clearance of our rivers, let alone other concomitant advantages. The proposal to make reservoirs to hold the flood waters to be returned to the river, would, in my opinion, only increase the evil tenfold. The true and only plan to diminish such disasters, is to endeavour to add to the scouring power of the river current, and by that means to deepen the bed,—an operation quite out of our power to accomplish by mechanical means alone. The fact is indubitable that both running and standing water, if not incessantly supplied with ordure, has a strong tendency to purify itself, and that independently of the great consumption of organic matters, and other impurities, by animal life, and aquatic vegetation. So that half a mile above any town or village, under such conditions, river water may be used with perfect freedom from disease, and London might be supplied with pure water to any amount at small cost. Thames water, as supplied to shipping, in three or four weeks becomes as black as ink, and emits a poisonous smell, but when the cask has stood for a week or two with the bung out the water becomes perfectly limpid and sweet. I have had personal experience of this fact in some of my early voyages, when wooden casks only were used. Mr. Denton, in the course of the remarks quoted, alludes to the river Kennet, the waters of which that gentleman supposes to be drinkable, but which are as foul above the town of Reading as the Thames ever was; and after passing through the town, and receiving the contents of some thousands of water-closets, sinks, and cesspools, it cannot be much sweeter when it joins the Thames, a little below the town. The new Reading Water Company make a pretence of filtering, but when the freshets come down, their filtered water is turbid; and at all times the filter is so badly arranged, that though the Kennet water is perfectly soft, after passing the filter it becomes so hard as to require a lump of soda to enable you to wash your hands with soap. The old Waterworks of Reading still supply all the water unfiltered for flushing, watering the streets, and for the railway works at a very low rate. As a further proof, if necessary, of the hardness of the water supplied by the Reading Company, I need only add that our kettles are quickly coated with successive layers of carbonates, each more than a sixteenth thick, not strongly adhering to each other. The scales are continually breaking off, and cause the boiled water to be always in a turbid state; yet the Reading Company are in possession of certificates from London analytical chemists, of the perfect softness of the water supplied by them to the consumer.—I am, &c., HENRY W. REVELEY.

Reading, Feb. 18.

WATER SUPPLY.—**SIR,**—In your report of my remarks made in the discussion on Mr. Beggs's paper an error has occurred. My concluding observation was to the effect that having been a member of the Corporation of the city of Salisbury, of the Board of Health, and also a vestryman in each of the parishes where my property is situated, I was of opinion that if the supply must be through either, I greatly preferred its administration being in the hands of municipal institutions rather than in those of vestries. I believe the very different results in the analyses of the water supply arise from some specimens being taken at the in-flow to the cistern, and others at the out-flow. I hold that every cistern, even in our best-arranged houses, should be drawn off—*i.e.* emptied—at least twice a year, and well cleansed, and if this is absolutely necessary in them, how much more so in those so graphically and truthfully described by Mr. Beggs, where old tubs, dilapidated cisterns, &c., are the only receptacles for the daily supply.—I am, &c., W. BORLY.

MEETINGS FOR THE ENSUING WEEK.

- MON.....** Entomological, 7.
 Odontological, 8.
 Farmers' Club, 5½. Rev. E. Smithies, "Emigration: What to do, and where to go."
 British Architects, 8.
 Medical, 7. Annual Election.
 Asiatic, 3.
 Victoria Inst., 8.
 London Inst., 7. Mr. Macfarren, "On the Origin and Development of the Lyrical Drama."
 Royal Inst., 2. General Monthly Meeting.
 R. United Service Inst., 8½. Staff-Commander H. A. Moriaty, C.B., R.N., "The Atlantic Telegraph Cables of 1857-58; also those of 1865-66."
 Society of Engineers, 7½. Mr. John J. Horner, "On certain methods of applying Screw Piles in the construction of a Wrought Iron Girder Bridge at Verona."
 Society of Arts. Cantor Lectures. Mr. Hullah, "On Music and Musical Instruments." Lecture I., Harmony.
- TUES ...** Royal Inst., 3. Rev. G. Henslow, "On Botany."
 R. United Service Inst., 8½. Adjourned Discussion on Mr. James Reddie's paper, "On Manning the Navy."
 Civil Engineers, 8. Captain H. W. Tyler, "On the Working of Steep Gradients and Sharp Curves on Railways."
 Pathological, 8.
 Ethnological, 8.
 Anthropological, 8.
 Geologists' Assoc., 8.
- WED ...** Society of Arts, 8. Discussion, introduced by Mr. Christopher Cooke, "On Storm Signals and Forecasts, their utility and public importance with respect to Navigation and Commerce."
 Geological, 8. 1. Rt. Hon. the Earl of Selkirk, "On ancient Sea-marks on the coast of Sweden." 2. The Duke of Argyll, "On a Palaeozoic Fossil found near Inverary, and on a post-tertiary Lignite Bed in the district of Kintyre." 3. Mr. W. S. Shea, "Report on recent discoveries of Gold in New Brunswick." 4. Mr. W. Wheelwright, "On the discovery of Coal on the Western Slope of the Andes." 5. Rev. P. B. Brodie, "On the presence of the Purbeck Beds at Brill, Buckinghamshire."
 Pharmaceutical, 8.
 Obstetrical, 8.
- THUR ...** Royal, 8½.
 Antiquaries, 8½.
 Linnean, 8. 1. Mr. J. P. M. Weale, "On the Structure and Fertilisation of the genus *Bonatea*, with a description of a species found at Bedford, S. Africa." 2. Description of *Musci* collected by the Rev. T. Powell in the Navigator's Islands."
 Chemical, 8.
 R. Society Club, 6.
 Artists and Amateurs, 8.
 Royal Inst., 3. Prof. Frankland, "On Coal Gas."
- FRI** Medical, 5. Anniversary Oration.
 Astronomical, 8.
 Royal Inst., 8. Rev. W. Greenwell, "On the Yorkshire Wold Tumuli."
- SAT** R. Inst. Prof. Frankland, "On Coal Gas."

PARLIAMENTARY REPORTS.

SESSIONAL PRINTED PAPERS.

Delivered on 16th February, 1867.

- Par.**
Numb.
 17. Bills—Industrial Schools (Ireland) (corrected copy).
 18. „ Trades' Unions (corrected copy).
 21. „ Association of Workmen.
 22. „ Vice President of the Board of Trade.

24. " Capital Punishments within Prisons.
 25. " Murder Law Amendment.
 5. Irish Reproductive Loan Fund—Account.
 12. Burghs (Scotland)—Returns.
 39. West India Islands, &c., Relief—Account.
 44. British North American Provinces—Letter (Part II.).
 Public Petitions—First Report.
Delivered on 18th February, 1867.
 26. Bill—Execution of Deeds.
 7. National Gallery—Report.
 29. Navy—Statement of Savings and Deficiencies.
 44. Metropolis (Union and Parochial Expenditure, &c.)—Return.
 55. Ecclesiastical Commission—Account.

- Delivered on 19th February, 1867.*
 23. Bill—Military at Elections (Ireland).
 1. Public Income and Expenditure—Account.
 30. Naval Receipt and Expenditure—Account.
 45. Bank of England—Account.

- Delivered on 20th February, 1867.*
 20. Bills—Railway Debenture Holders.
 31. " Land Tax Commissioners' Names.
 56. Army Estimates (1867-68).
 Public Petitions—Second Report.

- Delivered on 21st February, 1867.*
 27. Bills—Spiritual Destitution.
 33. " Mines, &c., Assessment.
 35. " Habeas Corpus Suspension (Ireland) Act Continuance.
 36. " Duty on Dogs.
 37. " Sugar Duties.
 48. East India (Revenues)—Return.
 49. East India (Loan)—Return.
 63. Army (Colonies)—Statement.
 64. Army (Variation of Numbers, &c.)—Statement.
 65. Military Reserve Funds—Account.

- Delivered on 22nd February, 1867.*
 12. Bills—Valuation of Property.
 15. " Church Rates Commutation.
 40. " Marriages (Odessa).
 41. " Criminal Lunatics.
 25. Russian Dutch Loan—Account.
 38. Naval Savings Bank Act (1866)—Order in Council.
 47. Board of Trade—Correspondence.
 50. Workhouses (Metropolis), Part I.—Return.
 50. (1.) Workhouses (Metropolis), Part II.—Return.
 52. Royal Irish Academy—Letter.
 54. Bank of England—Applications.
 59. Army (Roman Catholics)—Return.
 62. Coal Mines (Accidents and Explosions)—Circular Letter.
 70. Duchy of Cornwall—Account.
 Great Yarmouth Borough Election—Report of Commissioners.

- Delivered on 23rd February, 1867.*
 29. Bills—Tenants' Improvements (Ireland).
 30. " Land Improvement and Leasing (Ireland).
 23. Sardinian Loan—Account.
 24. Greek Loan—Account.
 57. Navy Estimates.
 66. Army (Manufacturing Establishments)—Return.
 Sugar Refining—Declaration.
 Reigate Borough Election—Report of Commissioners.

Patents.

From Commissioners of Patents' Journal, February 22nd.
 GRANTS OF PROVISIONAL PROTECTION.

- Agricultural fecundating agent—279—O. Monnet-Laverpillière.
 Aniline, &c., producing colours from—242—E. de Nève.
 Artificial fuel—309—S. Plant and W. Tatton.
 Athletic exercises, apparatus in—339—W. Frangley.
 Bales, &c., packing—200—J. Clark.
 Bleaching materials—3232—T. Gray.
 Blight in trees, &c., preventing—3403—C. D. Abel.
 Boots, &c.—206—B. Hunt.
 Breaks—299—R. D. Napier.
 Bricks—329—J. Foxley.
 Candlesticks—333—H. Dean and G. A. Wheeler.
 Card-distributors—226—J. E. Mellin and C. H. Ulbricht.
 Cartridge cases—240—C. E. Brooman.
 Chimney tops—275—J. A. Murray.
 Clocks—108—J. J. E. R. Houdin.
 Common road traction engines—267—J. H. Johnson.
 Electrical currents, developing—261—C. W. Siemens.
 Electric telegraph conductors and cables—212—J. H. Johnson.
 Electric telegraphs—220—C. Wheatstone.
 Envelope cases, &c.—305—G. W. Betjemann.
 Fibres of woods, separating—237—F. Bauman.
 Fibrous materials, doubling—234—T. Williams.
 Fibrous materials, doubling, &c.—283—H. Ermen.
 Fibrous substances, preparing, &c.—293—J. Smith and G. Wilson.
 Fibrous substances, producing—2981—H. A. Bonneville.
 Fire-arms and ordnance—319—J. Flows.
 Fire-arms, breech-loading—246—W. L. Wise.
 Fire-arms, breech-loading and needle-exploding, and cartridges for—251—P. Ellis.

- Foil of lead coated with tin, making—323—A. V. Newton.
 Furnaces—297—J. Stubbs.
 Gas—3300—E. Meldrum.
 Gas regulators—255—B. Hunt.
 Glass, gilding, &c.—265—E. H. Hughes.
 Hammers—202—W. E. Newton.
 Hats—301—C. Vero.
 Hydrostatic engines—120—C. G. Braxton.
 Iron and steel, casting articles in—244—W. E. Newton.
 Keys—238—J. Ritchie.
 Ladies' wearing apparel—3398—H. W. Shaw.
 Lady's companions—14—B. Nokes and T. Sanders.
 Lamps—190—J. L. Davies.
 Lamps—253—L. C. F. Clerc.
 Lime kilns—259—W. Lee.
 Liquids in cans, &c., securing—335—W. Rigg.
 Malt kilns, &c., heating—249—T. Prideaux.
 Mattresses—231—E. Walton.
 Metallic cases for preserved food—321—J. H. Johnson.
 Metals from their ores, obtaining—285—W. E. Newton.
 Metals, rolling, &c.—196—W. Gray.
 Ores of lead, treating—325—J. Wright and T. Cobley.
 Pianofortes—307—J. F. Philippi.
 Pianofortes, &c., apparatus used when playing on—315—I. Liebieh.
 Pipes for smoking—263—E. J. Padbury.
 Pneumatic apparatus—55—W. E. Newton.
 Railway carriages, lighting—58—W. T. Sugg.
 Railway carriages, lighting—230—F. G. Cambrelin.
 Railways, permanent way of—317—P. M. Parsons.
 Rotary engines—100—W. Clark.
 Ruling pens—201—W. Martin.
 Safes—3064—J. Nicholson.
 Safety bottle case—3400—B. Shaw and J. Appleyard.
 Safety-valves—192—J. Wolstenholme and E. Holt.
 Screws, cutting—269—E. T. Hughes.
 Self-fastening buckles—311—J. D. Bulloch.
 Sewing machinery—186—G. B. Woodruff.
 Shafts, &c., with india-rubber surfaces, forming—289—J. Poole.
 Ships—3276—J. H. Grell.
 Steam boilers—295—H. B. Wright.
 Steam cranes—277—G. Russell.
 Steam generators—303—B. Harlow.
 Stringed musical instruments—198—W. Pain.
 Tack-drivers and carpet-stretchers, combined—188—G. Haseltine.
 Taps—291—A. Bradshaw.
 Trousers—3437—T. W. Coudery.
 Tramways, &c.—232—J. Harworth.
 Wash-basins—147—R. Harlow.
 Water-closets—214—E. Lichtenstadt.
 Wheelgearing—208—P. Jensen.
 Weaving, looms for—156—W. J. and H. Harrison, and B. Croasdale.
 Weaving, looms for—236—W. Dickinson.
 Window sashes, &c.—273—T. Bullivant.
 Wool, cleansing—257—C. E. Brooman.

PATENTS SEALED.

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|-------------------------|--|
| 2166. T. Allen. | 2206. T. Davis. |
| 2167. E. Rimmel. | 2218. R. Irvine. |
| 2177. J. T. Poyser. | 2224. E. T. Hughes. |
| 2184. E. Green. | 2346. T. Wheelhouse. |
| 2185. W. L. Owen. | 2416. A. B. Walker. |
| 2186. C. Richardson. | 2426. W. Clark. |
| 2188. G. Little. | 2490. A. F. Johnson and M. P. Griffin. |
| 2193. S. Plimsoll. | 3304. W. E. Newton. |
| 2195. J. F. M. Pollock. | 3368. J. Howard. |
| 2205. W. Krutzsch. | |

From Commissioners of Patents' Journal, February 26th.

PATENTS SEALED.

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| 2210. W. Gould. | 2266. C. E. Brooman. |
| 2212. R. Buckton. | 2274. J. B. Brown. |
| 2213. J. Foster, jun. | 2290. W. Selby. |
| 2226. J. Richards and R. Grindle. | 2298. J. H. Johnson. |
| 2227. T. Turner, jun., and W. Siddons, jun. | 2448. T. Whitaker and J. Constantine. |
| 2232. J. Lochl and I. Pick. | 2466. A. V. Newton. |
| 2236. J. M. Mellor. | 2496. A. V. Newton. |
| 2239. T. Gall. | 2523. R. Hornsby & J. E. Phillips. |
| 2239. R. Daglish. | 2562. J. Ferrabee. |
| 2240. J. H. Johnson. | 2688. J. Miller. |
| 2246. J. Owens. | 2772. A. Turner. |
| 2254. J. Baker. | 3106. W. E. Newton. |
| 2256. A. W. Hosking. | 3352. T. Whitby. |
| 2258. M. Knowles. | 3355. A. V. Newton. |
| 2259. D. Caddick. | 3430. A. B. Ely. |

PATENTS ON WHICH THE STAMP DUTY OF £50 HAS BEEN PAID.

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| 480. C. Hull. | 475. W. E. Newton. |
| 503. J. W. Swan. | 542. W. Ibbotson. |
| 561. W. Dangerfield. | 728. F. L. Roux. |
| 470. T. Rowatt, jun., and A. Lighbody. | |

PATENT ON WHICH THE STAMP DUTY OF £100 HAS BEEN PAID.

522. G. Jenkins.